IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE: APPLICATION OF THELMA MANNING ET AL
Serial No.: NOT AVAILABLE
Filed: July 12 , 1999, By Expess Mail
For: HIGH ENERGY THERMOPLASTIC ELASTOMER PROPELLANT
Examiner: Edward A. Miller, Primary Examiner
Tele: (703) 306-4163
Art Unit: 3641
Tele: (703) 308-1113
Fax: (703) 305-7687
Att. Doc.No. DAR 18-95A1
Address: Commander, US Army
TACOM-ARDEC
Attn: AMSTA-AR-GCL
Picatinny Arsenal, NJ 07806-5000
Tele: (973) 724-6594
Fax: (973) 724-5552
Box: NON-FEE AMENDMENT
Assistant Commissioner for Patents
Washington, DC 20231

PRELIMINARY AMENDMENT

Honorable Commissioner,

Please enter this preliminary amendment and examine this application.

In the Specification, Page 1, line 7, please insert the following paragraph:

Cross-Reference To Related Applications

This application is a continuation of Serial Number 09/038,490, filed 03/06/1998, entitled High Energy Thermoplastic Elastomer Propellant, Serial Number 08/744042, filed 11/06/1996 entitled High Energy Thermoplastic Elastomer Propellant and is a Continuation in Part of Provisional Application Serial Number 60/006,671, filed 11/13/1995, entitled " Energetic Materials Having Thermoplastic Elastomeric Binders and High Energy Fillers

and Articles Containing The Same." The benefits of the filing dates of the above applications are hereby claimed.

REMARKS

This continuation application presents claims 1-5 for examination. It is submitted that the claims define an invention that overcomes the rejections of record in the parent applications and the case is in condition for allowance.

The present invention is a high energy propellant mixture which is formed by combining a pair of high energy propellants. The pair contains a fast burn rate propellant and a slow burn rate propellant. As shown in the specification, these propellant mixtures are particularly suited for ammunition because the ratio of the fast burn rate to the slow burn rate is at least three as measured at 25 kpsi. On account of that ratio , the slower burn rate propellant enters the ballistic cycle later than the fast burn rate propellant; this leads to increased efficiency in the use of the propellant mixture The propellants are equi-energetic and have an average impetus of at least 1300 Joules/g. The fast burn rate propellant contains 76 wt% of Cl-20, 20 wt% oxetane thermoplastic elastomer energetic binder and 4 wt% of TNAZ. It gave the highest burn rate of the several candidate propellant formulations as shown in Table VI. The rate of 21 inches at 25 kpsi was almost twice the next best formulations which also contained at least 76 Wt% CL-20. This high burn rate allows for latitude in selection of the slow burn rate propellant. The slow burn rate propellant is an oxetane thermoplastic elastomer energetic binder and RDX. The typical burn rates for this composition are 4.4 to 4.5, see Table VI. The invention has surprising and unexpected results in

achievement of superior performance from the compositions used in the invention

The claims clearly point out the invention as required by 35 USC 112. The claims are for a propellant mixture formed by combining a first fast burn high energy propellant and a slow burn rate high energy propellant where the ratio of the burn rates is at least three. Because of this ratio, the slow burn rate propellant will enter the ballistic cycle later than the fast burn rate propellant. The two propellants have a relationship to each other and to the overall mixture that is defined in the claims. Therefor, the claims define a statutory composition of matter or article under 35 USC 101 and 112 and are not impermissible agglomerations. The claims satisfy 35 USC 112.

As to the requirement for a new Declaration, new Declarations are enclosed for Ms. Manning. Messrs. Prezelski, Strauss, Moy, Lieb and Juhasz. The Declaration of Mr. Hartwell is expected shortly..

The claim for the benefit of the prior filing date of the parent applications is by amendment to the specification . This is in proper form under 35 USC 119(e), 35 USC 120 and 37 CFR 1.78.

It is submitted that the previous rejections of the claims over Manser et al '153 in view of Braithwaite et al and Lund et al under 35 USC 103 have been overcome. As discussed above, the invention of the present claims is a high energy propellant mixture formed by combining a pair of high energy propellants. One is a fast burn rate propellant; the other is a slow burn rate propellant. The ratio of the burn rates must be at least three. The fast burn rate propellant contains 76 wt% Cl-20, 20 wt% oxetane

thermoplastic elastomer energetic binder and 4 wt% TNAZ. The slow burn rate propellant is an oxetane thermoplastic elastomer energetic binder and RDX. The references of Manser et al "153 in view of Braithwaite et al and Lund et al do not teach or suggest the present invention.

Manser et al generally teaches that a particular class of energetic oxetane binders can be used in propellants and explosives. The formulations may contain plasticizers and have solids loadings of 70-90 wt%, col. 5 lls 40ff. They do not disclose the burn rate performance of their compositions.

Braithwaite et al teach explosive compositions of liquid energetic polymers and solid oxidizers where the oxidizer is at least 89% by wt. and preferably 92-96 % by wt., col. 2, lls 7-11, lls 35-38. The oxidizer may be CL-20. They do not disclose the burn rates of their compositions nor do they suggest modifying their compositions to achieve the benefits of the present invention.

Lund et al are concerned with explosive compositions which utilize a solid oxidizer known as TEX. The compositions may have 30 to 90 % TEX and 10 to 30% energetic binder. col. 3, lls 30-37. It may be combined with other oxidizers such as CL-20, col. 3, lls 19-24. Melt cast explosives may combine TEX and TNAZ as a melt modifier for TEX/oxidizer blends, col. 5., lls 9-16. The proportion of TNAZ is 15% to 40% of the total solids, col. 5, lls 25-30. They teach proportions which are outside the present claims and do not provide any burn rate data.

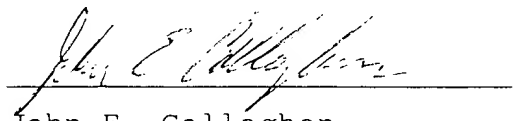
None of the references are concerned with multi burn rate propellant mixtures having at least a ratio of three

between the fast burn rate and the slow burn rate. This is necessary for the slow burn rate propellant to enter later in the ballistic cycle than the fast burn rate propellant. They do not disclose the burn rates of their compositions nor do they suggest how to modify their compositions to achieve the benefits of the present invention. . The rejections of the claims over these references have been overcome.

As to the other references in the IDS, they include prior references by the USPTO, references from the PCT search and new references submitted at the request of a contractor on behalf of its employee/co-inventor. The references are no more relevant than those already cited by the Examiner. The same arguments made above apply here; the invention as a whole is not taught or suggested by the several references.

Dated: 12 July 1999

Respectfully submitted,



John E. Callaghan,
Reg. No. 25,654
US Army, Patent Attorney